# SIE 504: The Beauty and Joy of Computing
## School of Computing and Information Science, University of Maine

## Contact Information

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## Course Description

This is an introductory course in computer science designed to prepare students with the skills and knowledge necessary to teach the first Advanced Placement (AP) course "Computer Science Principles", but will also be useful for students wishing to integrate computer science concepts into other academic disciplines. The course covers the AP Principles Framework and Computational Thinking Practices.

**Credits** 3

## Course Objectives

- Develop computational thinking strategies and the student's ability to analyze problems.
- Develop an understanding of how computers work, and some of the "big ideas" in computer science such as: abstraction, data, algorithms and the social impacts of the technology.
- Develop skill in a visual programming language.
- Prepare the students to teach the AP course "Computer Science Principles".

## Learning Outcomes

Upon successful completion of the course, students will be able to:
- Discuss the social implications of technology.
- Explain how data is stored and manipulated.
- Explain the roll of operating systems in managing and interacting with the computer.
- Write computer programs including conditionals, iteration, recursion and lists
- Describe ways computer networks are used to communicate and share resources and facilitate web processing
- Integrate computer programming into their classroom.

# Course Outline

This course will consist of video lectures, readings and programing activities.

**Primary Resources**
- Snap! ([snap.brekeley.edu/run](snap.brekeley.edu/run))
- Beauty and Joy of Computing Curriculum ([bjc.edc.org](bjc.edc.org))
- *Computer Science Illuminated*, (7th Ed) ,Lewis, J. & Dale, N. 2019, Jones & Bartlett Learning ISBN: 9781284155648

**Course Schedule**

| | Text Material | Programming Activities |
|---|---|---|
| Week 1 | Exploring "Unplugged Activities" Laying the Groundwork  - Ch. 1 | *Computer Science Unplugged,* https://csunplugged.org/en/ |
| Week 2 & 3 | An Introduction to Programming  - Ch. 6 & 7 | Getting started with Snap and Creating your first App. |
| Week 4 | An Introduction to Programming  (cont.) - Ch. 8 & 9 | Improving Your App with Variables |
| Week 5 & 6 | Data Storage and Representation – Ch. 2 & 3 | Data Processing and Lists |
| Week 7 & 8 | Operating Systems – Ch. 10 & 11 | Algorithms and Simulations |
| Week 9 & 10 | Applications – Ch. 12 - 13 | Fractals a & Recursion |
| Week 11 | Applications (cont.) Ch. 14 | Recursive Functions |
| Week 12 | Networks and the Web – Ch. 15 & 16 | Project work |
| Week 13 | Computer Security – Ch. 17 |  Project work |
| Week 14 | Limitations of Computing – Ch. 18 | Project work |
| Week 15 | Final Exam | Project Due |

# Grading

**Homework  (40%)**

Programming assignments will be due on a weekly basis until week 12.   Students will be encouraged to work together to solve problems, but the work submitted must be the student's own.  Late assignments will be penalized 3 points per day.

**Project (40%)**

Each student will be assigned a programming project to be completed on or before the scheduled final exam.  The project will include both a programming and non-programming component.

**Final Exam (20%)**

This will be based on the lecture and the assigned readings.

## Campus Policies

**Student Accessibility Services Statement:**
https://umaine.edu/scis/notices/#disability

**Academic Honesty Statement:**
https://umaine.edu/scis/notices/#honesty

**Nondiscrimination Notice:**
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**Sexual Discrimination Reporting:**
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